

JP 2000-251349 A

(11) Publication number : 2000-251349 (51) Int.CI. G11B 15/40
(43) Date of publication of application : 14.09.2000 G11B 15/43

(21) Application number : 11-050225 (71) Applicant : SONY CORP
(22) Date of filing : 26.02.1999 (72) Inventor : KANEKO SHINJI .
SAWAI ATSUSHI

(54) ELECTROSTATIC BRAKING MECHANISM, ELECTROSTATIC ELECTRODE FOR TAPE-LIKE RECORDING MEDIUM, AND REPRODUCING DEVICE AND REPRODUCING METHOD OF TAPE-LIKE RECORDING MEDIUM

(57) Abstract:

PROBLEM TO BE SOLVED: To obtain stable and highly reliable electrostatic braking mechanism and electrostatic electrode for a tape-like recording medium, a reproducing device of the tape-like recording medium and the reproducing method, by preventing the tape-like recording medium from damaging, rolling in a rotary member, etc., and further falling off, in the still reproduction.

SOLUTION: The running state of the running tape-like recording medium 23 which is wound on a rotary drum 24 having heads 25 while the tension is added, is stopped and the tape-like recording medium 23 is electrostatically attracted and fixed by the electrostatic braking mechanism EC arranged at the upstream side from the rotary drum 24, and after the tape-like recording medium 23 is inversely fed to the direction W in some amount by the reverse rotation of a capstan 27 positioned at the downstream side from the rotary drum 24, the tape-like recording medium 23 is fixed and held at the position of the capstan 27.

Disclaimer

This is a machine translation performed by NCIPI (<http://www.ipdl.ncipi.go.jp>) and received and compiled with PatBot (<http://www.patbot.de>). PatBot can't make any guarantees that this translation is received and displayed completely!

Notices from NCIPI

Copyright (C) JPO, NCIPI

The JPO and NCIPI are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] The tension controlling mechanism which an information signal is recorded on the magnetic recording layer prepared in one side of a tape-like insulating layer, and gives a predetermined tension to the tape-like record medium it can run in the predetermined transit direction, The insulating base which is arranged from the tension controlling mechanism concerned at the downstream of the predetermined transit direction concerned, builds in a read head, is arranged in the location between the rotating drums which **** the tape-like record medium concerned and rotate, and has a predetermined dielectric constant, The electrode which is prepared on said insulating base and receives supply of an electrical potential difference, and the insulating enveloping layer which covers said electrode, It is the electrostatic brake mechanism of the tape-like record medium which is equipped with an electrical-potential-difference impression means to impress an electrical potential difference to said electrode, and is characterized by arranging said electrode in the location which can contact said insulating layer of said tape-like record medium through said enveloping layer.

[Claim 2] Carry out loading of the tape-like record medium with which the information signal was recorded on the magnetic recording layer prepared in one side of a tape-like insulating layer, and it is made to run a predetermined transit way. The insulator which is the electrostatic electrode brake mechanism provided to the equipment which reproduces the information signal concerned from the tape-like record medium concerned, is arranged in the middle of said transit way of said tape-like record medium, and has a predetermined dielectric constant, The electrostatic electrode characterized by having provided the electrode which generates static electricity which is held on said insulator, and attracts and holds said insulating layer of said tape-like record medium by impressing an electrical potential difference, and the insulating enveloping layer which covers said electrode, and being constituted.

[Claim 3] An information signal is recorded on the magnetic recording layer prepared in one side of a tape-like insulating layer. The tape-like record medium it can run in the predetermined direction is ****(ed) to the rotating drum equipped with the head. The tension controlling mechanism arranged from the rotating drum concerned at the upstream of the predetermined direction concerned gives a predetermined tension to the tape-like record medium concerned. Send out the tape-like record medium concerned in the predetermined direction concerned by the revolution of the capstan located in the downstream of the predetermined direction concerned, and make it run from the rotating drum concerned. The insulating base which is the regenerative apparatus of a tape-like record medium and has a predetermined dielectric constant from said tension controlling mechanism from a rotating drum to the downstream and the upstream, The electrode which is prepared on said insulating base and receives supply of an electrical potential difference, and the insulating enveloping layer which covers said electrode, The electrostatic brake mechanism which is equipped with an electrical-potential-difference impression means to impress an electrical potential difference to said electrode, and static electricity generates in said electrode in impression of said electrical potential differenceIt arranges in said insulating layer of said tape-like record medium possible [contact]. When stopping transit of said tape-like record medium, rotating said rotating drumSaid capstan pinches said tape-like record medium while suspending a revolution. It is the regenerative apparatus of the tape-like record medium characterized by considering as the configuration which attracts said tape-like record medium with which said tension controlling mechanism eases said tension, and said electrostatic brake mechanism contacts with static electricity, and brakes it.

[Claim 4] An information signal is recorded on the magnetic recording layer prepared in one side of a tape-like insulating layer. The tape-like record medium it can run in the predetermined direction is ****(ed) to the rotating drum equipped with the head. The tension controlling mechanism arranged from the rotating drum concerned at the upstream of the predetermined direction concerned gives a predetermined tension to the tape-like record medium concerned. Send out the tape-like record medium concerned in the predetermined direction concerned by the revolution of the capstan located in the downstream of the predetermined direction concerned, and make it run from the rotating drum concerned. The insulating base which is the regenerative apparatus of a tape-like record medium and has a predetermined dielectric constant from said tension controlling mechanism from a rotating drum to the downstream and the upstream, The electrode which is prepared on said insulating base and receives supply of an electrical potential difference, and the insulating enveloping layer which covers said electrode, The electrostatic brake mechanism which is equipped with an electrical-potential-difference impression means to impress an electrical potential difference to said electrode, and static electricity generates in said electrode in impression of said electrical potential differenceIt arranges in said insulating layer of said tape-like record medium possible [contact]. When stopping transit of said tape-like record medium, rotating said rotating drumSaid capstan suspends a revolution and said tension controlling mechanism eases said tension. It is the regenerative apparatus of the tape-like record medium characterized by considering as the configuration with which said tape-like record medium with which said electrostatic brake mechanism contacts is attracted with static electricity, and is braked, counterrotation of said capstan is subsequently carried out by predetermined, and only the specified quantity sends said tape-like record medium to said rotating-drum side.

[Claim 5] To the tape-like record medium records an information signal on the magnetic recording layer prepared in the insulating layer, and it runs in the predetermined directionGive a predetermined tension, contact the magnetic recording layer concerned to the periphery of the rotating drum which is subsequently equipped with a read head and rotates, and the information signal concerned is reproduced. The 1st control procedure which sends the tape-like record medium concerned in the predetermined direction concerned by the revolution of the capstan of the downstream from the rotating drum concerned to carry out, The 2nd control procedure which makes the tension which suspends the revolution of said capstan and is given to said tape-like record medium in case transit of said tape-like record medium is stopped during a revolution of said rotating drum ease, Impress an electrical potential difference to the electrode prepared in the location between said rotating drums and said tension controlling mechanisms, and with static electricity to generateThe playback approach of the tape-like record medium characterized by having the 3rd control procedure which said insulating-layer side of said tape-like record medium with which the tension was eased is made to adsorb, and is made to fix.

[Claim 6] To the tape-like record medium records an information signal on the magnetic recording layer prepared in the insulating layer, and it runs in the predetermined directionGive a predetermined tension, contact the magnetic recording layer concerned to the periphery of the rotating drum which is subsequently equipped with a read head and rotates, and the information signal concerned is reproduced. The 1st control procedure which sends the tape-like record medium concerned in the predetermined direction concerned by the revolution of the capstan of the downstream from the rotating drum concerned to carry out, The 2nd control procedure which makes the tension which suspends the revolution of said capstan and is given to said tape-like record medium in case transit of said tape-like record medium is stopped during a revolution of said rotating drum ease, Impress an electrical potential difference to the electrode prepared in the location between said rotating drums and said tension controlling mechanisms, and with static electricity to generateThe 3rd control procedure which said insulating-layer side of said tape-like record medium with which the

tension was eased is made to adsorb, and is made to fix, The playback approach of the tape-like record medium characterized by having the 4th control procedure which the amount of counterrotation is measured [control procedure] and advances said tape-like record medium to hard flow by predetermined while carrying out counterrotation of said capstan.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the regenerative apparatus and the playback approach of the electrostatic brake mechanism of a tape-like record medium, an electrostatic electrode, and a tape-like record medium.

[0002]

[Description of the Prior Art] As an image record regenerative apparatus, the VCR equipment (video cassette recorder) which records and reproduces a video signal to a tape-like magnetic-recording medium has spread widely. In this VCR equipment, when reproducing that information signal from the tape-like record medium with which the information signal was recorded, special playback of the still (STILL) playback mode which reproduces a still picture besides the Normal playback (PB) mode in which the usual animation playback is performed, and the jog (JOG) mode which is rapid-traverse playback is constituted possible.

[0003] Drawing 10 is drawing showing the transit way of the tape-like record medium in the VCR equipment of the conventional U loading method, i.e., the condition of tape pass. In addition, in subsequent publications, a tape-like record medium may be written as a tape.

[0004] If VCR equipment is equipped with the videocassette 20 on which it had the supply (supply) reel 21 and the take-up-machine (rolling up) reel 22, and the tape-like record medium 23 was stored as shown in this drawing, loading of the tape-like record medium 23 pulled out out of the videocassette 20 will be carried out, and it will be twisted around a rotating drum 24.

[0005] The rotating capstan 27 and pinch roller 28 rotate on both sides of the tape-like record medium 23, and make it run the tape-like record medium 23 in the direction of an arrow head of drawing certainly in the Normal play mode or jog mode. On the other hand, by the head 25 prepared in the periphery of this rotating drum 24, the sweep of the dip truck by which record formation was carried out on the tape-like record medium 23 is carried out to order by revolution of a rotating drum 24, and a video signal is reproduced.

[0006] In this case, the tape pass of the tape-like record medium 23 is regulated with two or more guide pins 26.

[0007] The revolution pin 29 furthermore attached in the tension arm (not shown) gives a fixed tension to the tape-like record medium 23 under transit. The dip pin 30 is adjusting the height of the tape-like record medium 23 between the location of a head 25, and the rolling-up location of the take-up-machine reel 22.

[0008] On the other hand, in the still playback mode which reproduces a still picture as special playback, the revolution of a capstan 27 is suspended, or a capstan 27 and a pinch roller 28 are detached, an insert lump of the tape-like record medium 23 is stopped, transit of the tape-like record medium 23 is suspended, and the same image is reproduced as a still picture based on the signal by which incorporates to a field memory or a frame memory and provisional storage is carried out.

[0009] For example, with the configuration of VTR specification conformity of a digital method, the signal of ten trucks or 12 trucks is memorized by the frame memory as a signal of one frame. It is constituted so that a rotating drum 24 may

continue a constant revolution on the problem between this still playback mode and on inertia, but it is constituted so that the tension by a head 25 and the periphery part of a rotating drum 24 contacting the same part on the tape-like record medium 23 repeatedly given to the tape-like record medium 23 may be eased, in order to mainly avoid breakage on the tape-like record medium 23.

[0010] The tension given to the tape-like record medium 23 in this still playback mode avoids omission of the tape-like record medium 23, and the tape-like record medium 23 flusters, generating is suppressed, and the value to which the tape-like record medium 23 is not sent out by the airstream further formed in a periphery by revolution of a rotating drum 24 is applied. For example, it is referred to as 5gr(s) with the configuration of DV specification conformity.

[0011]

[Problem(s) to be Solved by the Invention] By the way, with VTR equipment, it is applied in the state of the still of the long duration in a search part in many cases at the time of edit. Moreover, when business-use VTR equipment sends out commercials, search with the always same frame address is performed. Thus, in the case of the tape for edit raw materials, the same image is reproduced repeatedly in many cases, and still time amount also becomes long.

[0012] As mentioned above, since the tension given to the tape-like record medium 23 in still playback mode is eased, although many parts of the tape-like record medium 23 are estranged from a rotating drum 24, since a tension minimum by the aforementioned reason is needed, some tape-like record media [at least] 23 which carried out a transit halt will continue contacting the rotating drum 24 which also rotates the inside of still playback mode continuously by the low tension.

[0013] For this reason, when still time amount became long, there was a problem that a possibility that breakage on the tape by contact may increase arose. The durable time amount of a still based on extent of tape breakage changes mainly with tape thickness and numbers of heads applied. On the tape of the about 10-16-micrometer tape thickness used by the conventional editor, although several hours were secured, as for the durable time amount of a still, the durable time amount of a still is short as the miniaturization of a tape cassette and the request of long duration record playback to tape thickness becomes thin.

[0014] In DV specification conformity which the durable time amount of a still is about 1 hour with the VTR equipment of a general application, and is about 7-8 micrometers of tape thickness, it is shortened further. Especially, in the editor of many heads, still durable time amount becomes still shorter.

[0015] Although the function which equips an editor with a still-off timer and carries out the forcible stop of the still playback in [predetermined] several minutes that lowering of such still durable time amount should be coped with was preparedSince it depended also on uncertain factors, such as variation in the manufacture lot of a tape, in addition to the tension given, temperature, humidity, the number of heads, head projection height, etc., the problem that it did not become a positive guarantee even if it applies fixed still playback time amount had the endurance of the still of a tape.

[0016] Furthermore, if the still playback command is sent from the editor even if it emits the signal of still playback OFF to the device section by the VTR equipment side since it is controlled by the editor, the problem that still playback continues for a long time will generate an editor by giving priority to this command.

[0017] By the way, the result of the effect which a tape receives at the time of still playback is as follows.

1. The crease of a tape edge and exfoliation of a deflection 4. magnetism side

[0018] by tape oscillating 3. oscillation by breakage on a truck gap 2. tape front face [by tape deformation] If a tension is made to increase that the

above-mentioned truck gap should be canceled, the blemish of a magnetic side and exfoliation will arise and durable time amount will deteriorate. Furthermore, if a tape oscillation, a crease of an edge, and deflection arise, effect will also generate stationary transit and the problem from which the lock phase of a rotating drum changes will occur.

[0019] Moreover, although the proposal which changes a still location for a short time was made, there is a problem that the still address will change from the constraint on a capstan revolution a lot. The proposal to which a tape is furthermore moved to the location which does not require stress is not adopted, either, in order to require time amount (M mold loading takes 4 - 5 seconds by U mold loading 1 second or more). Moreover, with this configuration, there was a problem that tape stress newly occurred by tape volume attachment by the drum on which height differs.

[0020] When in addition to the above a tension fell because a tension arm moves further and the revolution pin 29 moves, and the minimum tension was maintained as mentioned above, the new problem that yes, the tape-like record medium 23 which obtained and sometimes slackened was involved in a rotating drum 24 might occur.

[0021] Then, this invention aims at preventing breakage on a tape-like record medium in still playback, and preventing the contamination to the revolution member of a tape-like record medium etc., preventing omission of a tape-like record medium further, and offering the regenerative apparatus and the playback approach of the electrostatic brake mechanism of a tape-like record medium with high stability and dependability, an electrostatic electrode, and a tape-like record medium.

[0022]

[Means for Solving the Problem] The electrostatic brake mechanism of the tape-like record medium concerning this invention that the aforementioned object should be attainedA tension control means for an information signal to be recorded on the magnetic recording layer prepared in one side of a tape-like insulating layer, and to give predetermined tension to the tape-like record medium it can run in the predetermined transit direction, The insulating base which is arranged from the tension control means concerned at the downstream of the predetermined transit direction concerned, builds in a read head, is arranged in the location between the rotating drums which **** the tape-like record medium concerned and rotate, and has a predetermined dielectric constant, The electrode which is prepared on said insulating base and receives supply of an electrical potential difference, and the insulating enveloping layer which covers said electrode, It has an electrical-potential-difference impression means to impress an electrical potential difference to said electrode, and is characterized by arranging said electrode in the location which can contact said insulating layer of said tape-like record medium through said enveloping layer.

[0023] According to the aforementioned configuration, by being prepared on the insulating base which is an insulating material, static electricity occurs in this electrode, a carrier beam electrode is that an insulating base moreover insulates, and with an electrical-potential-difference impression means, while supply of an electrical potential difference continues, static electricity is stabilized by it and it generates supply of an electrical potential difference. A tape-like record medium adsorbs with this static electricity.

[0024] The electrostatic electrode concerning this invention carries out loading of the tape-like record medium with which the information signal was recorded on the magnetic recording layer prepared in one side of a tape-like insulating layer, and it is made to run a predetermined transit way. The insulator which is the electrostatic electrode provided to the equipment which reproduces the information signal concerned from the tape-like record medium concerned, is arranged in the middle of said transit way of said tape-like record medium, and has a predetermined dielectric constant, It is characterized by having provided the electrode which generates static electricity which is held on said insulator, and attracts and holds said insulating layer of said tape-like record medium by

impressing an electrical potential difference, and the insulating enveloping layer which covers said electrode, and being constituted.

[0025] According to the aforementioned configuration, by being prepared on the insulating base which is an insulating material, if an electrical potential difference is supplied to this electrostatic electrode, static electricity will generate an electrostatic electrode. And while supply of an electrical potential difference continues, static electricity is stabilized and it generates, because an insulating base insulates. The electrostatic electrode electrified [this] adsorbs in a tape-like record medium.

[0026] The regenerative apparatus of the tape-like record medium concerning this inventionAn information signal is recorded on the magnetic recording layer prepared in one side of a tape-like insulating layer. The tape-like record medium it can run in the predetermined direction is ****(ed) to the rotating drum equipped with the head. The tension controlling mechanism arranged from the rotating drum concerned at the upstream of the predetermined direction concerned gives a predetermined tension to the tape-like record medium concerned. Send out the tape-like record medium concerned in the predetermined direction concerned by the revolution of the capstan located in the downstream of the predetermined direction concerned, and make it run from the rotating drum concerned. The insulating base which is the regenerative apparatus of a tape-like record medium and has a predetermined dielectric constant from said tension controlling mechanism from a rotating drum to the downstream and the upstream, The electrode which is prepared on said insulating base and receives supply of an electrical potential difference, and the insulating enveloping layer which covers said electrode, The electrostatic brake mechanism which is equipped with an electrical-potential-difference impression means to impress an electrical potential difference to said electrode, and static electricity generates in said electrode in impression of said electrical potential differenceIt arranges in said insulating layer of said tape-like record medium possible [contact]. When stopping transit of said tape-like record medium, rotating said rotating drumSaid capstan pinches said tape-like record medium while suspending a revolution, said tension controlling mechanism eases said tension, and it is characterized by considering said tape-like record medium with which said electrostatic brake mechanism contacts as the configuration which draws in with static electricity and brakes.

[0027] According to the aforementioned configuration, transit of a tape-like record medium is suspended by the down-stream capstan from a rotating drum, and tension relaxation is made according to an upstream tension controlling mechanism from a rotating drum. On the other hand, since a rotating drum is under revolution, an air space is formed between the tape-like record media with which a transit halt was carried out with the rotating drum, and the tension was eased, and the tape-like record medium under a low tension is drawn a little only for an amount in a rotating-drum side by this air space. Subsequently, if a tape-like record medium is fixed by the electrostatic brake mechanism in the location between a rotating drum and a tension controlling mechanism, the tape-like record medium only whose amount of some of the rotating-drum circumference increased will be estranged from a rotating drum by the air space formed.

[0028] The regenerative apparatus of the tape-like record medium concerning this inventionAn information signal is recorded on the magnetic recording layer prepared in one side of a tape-like insulating layer. The tape-like record medium it can run in the predetermined direction is ****(ed) to the rotating drum equipped with the head. The tension controlling mechanism arranged from the rotating drum concerned at the upstream of the predetermined direction concerned gives a predetermined tension to the tape-like record medium concerned. Send out the tape-like record medium concerned in the predetermined direction concerned by the revolution of the capstan located in the downstream of the predetermined direction concerned, and make it run from the rotating drum concerned. The insulating base which is the regenerative apparatus of a tape-like record medium and has a predetermined dielectric constant from said tension controlling

mechanism from a rotating drum to the downstream and the upstream, The electrode which is prepared on said insulating base and receives supply of an electrical potential difference, and the insulating enveloping layer which covers said electrode, The electrostatic brake mechanism which is equipped with an electrical-potential-difference impression means to impress an electrical potential difference to said electrode, and static electricity generates in said electrode in impression of said electrical potential differenceIt arranges in said insulating layer of said tape-like record medium possible [contact]. When stopping transit of said tape-like record medium, rotating said rotating drumSaid capstan suspends a revolution and said tension controlling mechanism eases said tension. It is characterized by considering as the configuration with which said tape-like record medium with which said electrostatic brake mechanism contacts is attracted with static electricity, and is braked, counterrotation of said capstan is subsequently carried out by predetermined, and only the specified quantity sends said tape-like record medium to said rotating-drum side.

[0029]According to the aforementioned configuration, transit of a tape-like record medium is suspended by the down-stream capstan from a rotating drum, and tension relaxation is made according to an upstream tension controlling mechanism from a rotating drum. Subsequently, a tape-like record medium is fixed by the electrostatic brake mechanism in the location between a rotating drum and a tension controlling mechanism, subsequently to the rotating-drum circumference, a suitable quantity of a tape is supplied by the counterrotation of a capstan, an air space is formed between a rotating drum and a tape-like record medium by this of it, and a tape-like record medium is estranged from a rotating drum by it.

[0030]The playback approach of the tape-like record medium concerning this inventionTo the tape-like record medium records an information signal on the magnetic recording layer prepared in the insulating layer, and it runs in the predetermined directionGive a predetermined tension, contact the magnetic recording layer concerned to the periphery of the rotating drum which is subsequently equipped with a read head and rotates, and the information signal concerned is reproduced. The 1st control procedure which sends the tape-like record medium concerned in the predetermined direction concerned by the revolution of the capstan of the downstream from the rotating drum concerned to carry out, The 2nd control procedure which makes the tension which suspends the revolution of said capstan and is given to said tape-like record medium in case transit of said tape-like record medium is stopped during a revolution of said rotating drum ease, It is characterized by having the 3rd control procedure which impresses an electrical potential difference to the electrode prepared in the location between said rotating drums and said tension controlling mechanisms, and said insulating-layer side of said tape-like record medium with which the tension was eased is made to adsorb, and is made to fix with static electricity to generate.

[0031]Although an air space is formed between the tape-like record media with which a transit halt was carried out with the rotating drum under revolution, and the tension was easedAccording to the aforementioned approach, a transit halt of a tape-like record medium should do by the down-stream capstan from a rotating drum. When tension relaxation is made by the upstream tension controlling mechanism from a rotating drumBy a tape-like record medium's being drawn a little only for an amount in a rotating-drum side by the air space under a low tension, and subsequently fixing a tape-like record medium by braking by static electricity of an electrode in the location between a rotating drum and a tension controlling mechanismThe tape-like record medium only whose amount of some of the rotating-drum circumference increased is estranged from a rotating drum by the air space formed.

[0032]The playback approach of the tape-like record medium concerning this inventionTo the tape-like record medium records an information signal on the magnetic recording layer prepared in the insulating layer, and it runs in the

predetermined directionA tension controlling mechanism gives a predetermined tension, contacts the magnetic recording layer concerned to the periphery of the rotating drum which is subsequently equipped with a read head and rotates, and reproduces the information signal concerned. The 1st control procedure which sends the tape-like record medium concerned in the predetermined direction concerned by the revolution of the capstan of the downstream from the rotating drum concerned to carry out, The 2nd control procedure which makes the tension which suspends the revolution of said capstan and is given to said tape-like record medium in case transit of said tape-like record medium is stopped during a revolution of said rotating drum ease, Impress an electrical potential difference to the electrode prepared in the location between said rotating drums and said tension controlling mechanisms, and with static electricity to generateThe 3rd control procedure which said insulating-layer side of said tape-like record medium with which the tension was eased is made to adsorb, and is made to fix, While carrying out counterrotation of said capstan, it is characterized by having the 4th control procedure which the amount of counterrotation is measured [control procedure] and advances said tape-like record medium to hard flow by predetermined.

[0033]Although an air space is formed between the tape-like record media with which a transit halt was carried out with the rotating drum under revolution, and the tension was easedAccording to the aforementioned approach, a transit halt of a tape-like record medium should do by the down-stream capstan from a rotating drum. After tension relaxation is made by the upstream tension controlling mechanism from a rotating drumBy fixing a tape-like record medium by braking by static electricity of an electrode in the location between a rotating drum and a tension controlling mechanism, and subsequently carrying out detection control of the amount of counterrotation of a capstanA suitable quantity of a tape is supplied around a rotating drum, the air space of predetermined spacing is formed between a rotating drum and a tape-like record medium by this, and a tape-like record medium is estranged from a rotating drum.

[0034]

[Embodiment of the Invention]Hereafter, the suitable operation gestalt of this invention is explained to a detail with reference to an attached drawing. In addition, although the operation gestalt described below is a part of suitable example to show the essential configuration and essential operation of this invention, therefore desirable various definition may be attached on the technical configuration, especially the range of this invention is not restricted to these gestalten, as long as there is no publication of the purport which limits this invention in the following explanation.

[0035]Drawing 1 is the explanatory view of the configuration of 1 operation gestalt of the electrostatic brake mechanism concerning this invention. Drawing 2 is the ** type perspective view of the important section of the VTR equipment with which the electrostatic brake mechanism shown in drawing 1 was incorporated. Drawing 3 is the perspective view of the configuration of 1 operation gestalt of the electrostatic braking object shown in drawing 1. Drawing 4 is an explanatory view in the condition that the electrostatic brake mechanism shown in drawing 1 was incorporated.

[0036]As shown in drawing 1 and drawing 4, the electrostatic brake mechanism EC concerning this invention is equipped with the electrostatic braking object 31 and the electrical-potential-difference impression means which consists of a high voltage generating control circuit 16 and a high voltage generating circuit 17, and is constituted.

[0037]The electrostatic braking object 31 consists of 31d of wrap enveloping layers in insulating base 31b which has a dielectric constant predetermined in the configuration to which it cut at both the edges of the front perpendicular direction of a rectangular parallelepiped, and the chip was given, electrostatic electrode 31a ****(ed) in the longitudinal direction in that center of a front face, and this electrostatic electrode 31a, as shown in drawing 3 and drawing 4, and insulating base 31b is supported by the stand 130.

[0038] The lengthwise direction dimension of electrostatic electrode 31a has a desirable configuration exceeding the width of face of the tape-like record medium 23, and the longitudinal direction **** along the transit direction of the tape-like record medium 23. Furthermore, electrostatic electrode 31a is arranged on the transit way of the tape-like record medium 23, and it is constituted so that the tape-like record medium 23 may be contacted.

[0039] Terminal 31e is prepared in electrostatic electrode 31a, and high tension is impressed from the high voltage generating circuit 17 between this terminal 31e and a chassis. Static electricity is distributed over electrostatic electrode 31a as positive charge by impression of this high tension, and the tape-like record medium 23 is adsorbed at electrostatic electrode 31a by drawing the negative charge which this positive charge made carry out polarization of the insulating layer of the tape-like record medium 23, and produced.

[0040] The high voltage generating circuit 17 generates the high tension of about 1.5kV to the timing controlled from the high voltage generating control circuit 16, and impresses it between terminal 31e and a chassis. If positive charge will arise promptly in electrostatic electrode 31a, the adsorption power of the tape-like record medium 23 will occur, if high tension is supplied from the high voltage generating circuit 17, and the high voltage supply from the high voltage generating circuit 17 stops, the positive charge of electrostatic electrode 31a will discharge promptly, and the adsorption power of the tape-like record medium 23 will be lost. This electrostatic adsorption power is proportional to the product of effective die-length [of electrostatic electrode 31a] (tape length which contacts) L, electrode voltage E, and tape width t**. It is proportional to products, such as coefficient of friction between the dielectric constant of 31d of enveloping layers, a tape 23, and 31d of enveloping layers.

[0041] Below, the configuration of the perimeter where this electrostatic brake mechanism EC is arranged is explained. Loading of the tape-like record medium 23 is carried out to the magnetic recording layer prepared in one side of a tape-like insulating layer from the cassette (refer to drawing 2) with which the information signal was recorded and it was equipped, and it runs in the predetermined transit direction V at the time of playback.

[0042] It attaches and twists dip around a part of the peripheral face so that the magnetic recording layer side of the tape-like record medium 23 it runs may contact, and consists of linear velocity quicker than the linear velocity of the tape-like record medium 23 it moreover runs pivotable while the cylindrical rotating drum 24 is cylindrical, can contain the reproducing heads 25a and 25b of a video signal, and erase-head 25c in the periphery and can be freely rotated to a shaft center.

[0043] Two or more guide pins 26 are vertically formed in the surrounding chassis side of a rotating drum 24. It is regulated with two or more of these guide pins 26, the transit way, i.e., the tape pass, of the tape-like record medium 23.

[0044] The tape-like record medium 23 advances from the location of the guide pin 26 of rotating-drum 24 left-hand side in drawing, contacts in the location near the periphery left end of a rotating drum 24, is ****(ed) over the range of 180 degrees or more to the location which surpasses a periphery right end through the location of the periphery soffit of a rotating drum 24, and runs to the location of the guide pin 26 of rotating-drum 24 right-hand side.

[0045] The capstan 27 and the pinch roller 28 are formed in the tape pass of the point possible [pinching of the tape-like record medium 23]. In case it is made to run the tape-like record medium 23, a pinch roller 28 is moved, the tape-like record medium 23 is pressed to a capstan 27, and a tape runs certainly by the revolution of a capstan 27.

[0046] On the other hand, after the revolution pin 29 pulls out and carries out loading of the tape-like record medium 23 to the tension regulation arm 34 from a mounting eclipse and the cassette with which it was equipped, it is located in the location X1 in drawing, and gives a fixed tension to the tape-like record medium 23 under transit. Moreover, the tension regulation arm 34 moves the

revolution pin 29 to a location X2, and a tension is made to mitigate at the time of a transit halt of the tape-like record medium 23.

[0047]The tape-like record medium 23 to which the capstan 27 rotated during the Normal playback and the tape-like record medium 23 was supplied from delivery and the supply reel 21 by whenever [fixed-speed] and to which the predetermined tension was given by the revolution pin 29 is ****(ed) by the rotating drum 24 as mentioned above, runs, and is rolled round by the take-up-machine reel 22 through a capstan 27 and a pinch roller 28.

[0048]On the other hand, the electrostatic brake mechanism EC is non-operative in the meantime, and the tape-like record medium 23 is running the location distant from the electrostatic braking object 31.

[0049]Subsequently, if it shifts to the still playback which stops transit of the tape-like record medium 23 from this Normal playback, rotating a rotating drum 24, the revolution of a capstan 27 will be suspended and a revolution of the supply reel 21 and the take-up-machine reel 22 will be suspended simultaneously.

[0050]Here, although the revolution of a capstan 27 stops, a pinch roller 28 is still put on the location which presses a capstan 27. Consequently, the tape-like record medium 23 is being fixed between the capstan 27 and the pinch roller 28.

[0051]The tension regulation arm 34 makes a revolution halt and coincidence of a capstan 27 move the revolution pin 29 to the still location X2, and makes them mitigate a tension. When the revolution pin 29 moves to the still location X2, the path of the tape-like record medium 23 is changed and it comes to contact the electrostatic braking object 31.

[0052]A rotating drum 24 rotates with linear velocity with a large peripheral face, and on the other hand, since the tape-like record medium 23 has stopped, an air space is formed between a rotating drum 24 and the tape-like record medium 23 here.

[0053]Therefore, if the tension which the revolution pin 29 moves to the still location X2, and is given to the tape-like record medium 23 is mitigated, a tape will be sent a little to an amount and rotating-drum 24 side by this air space.

[0054]Next, when high tension is supplied to electrostatic electrode 31a of the electrostatic braking object 31 from the high voltage generating circuit 17 and static electricity occurs in electrostatic electrode 31a, electrostatic electrode 31a carries out electrostatic attraction of the tape-like record medium 23, and the tape-like record medium 23 is adsorbed and fixed to the electrostatic braking object 31.

[0055]As it is the above, the tape-like record medium 23 will be in the condition that the tape-like record medium 23 which the allowances of an amount produced [fixed / fixed from the rotating drum 24 by the electrostatic brake mechanism EC of the upstream / from the rotating drum 24 between the capstan 27 of the downstream and the pinch roller 28] a little around rotating-drum 24 exists.

[0056]Since the tension of the tape-like record medium 23 of the rotating-drum 24 circumference falls further since the tension by the tension regulation arm 34 and the revolution pin 29 is intercepted in the electrostatic brake mechanism EC here, and there are allowances of an amount a little as mentioned above, the tape-like record medium 23 of the rotating-drum 24 circumference rides on the air space which a rotating drum 24 forms easily, and deserts rotating-drum 24 periphery. This estrangement is maintained regularly.

[0057]Consequently, even if it is lost during still playback that the tape-like record medium 23 contacts a rotating drum 24 and prolonged still playback is made, breakage on the tape-like record medium 23 by the collision with rotating-drum 24 side face or a head 25 can be prevented, and wear of a head 25 can be prevented simultaneously.

[0058]Moreover, by fixing the tape-like record medium 23 by the electrostatic brake mechanism EC, and a capstan 27 and a pinch roller 28, even if a tension

falls, the tape-like record medium 23 is not omitted.

[0059] Furthermore, since it is not generated by the amount of [beyond this] play in the amount of tapes by fixing the tape-like record medium 23 by the electrostatic brake mechanism EC, and a capstan 27 and a pinch roller 28, even if the rotating drum 24 is rotating, the tape-like record medium 23 is not involved in.

[0060] And since it holds and fixes, without the electrostatic brake mechanism EC applying mechanical press to the tape-like record medium 23, breakage on deformation etc. is not done to the tape-like record medium 23 during maintenance.

[0061] Furthermore, electrostatic electrode 31a of the electrostatic brake mechanism EC can make the tape-like record medium 23 secede from the electrostatic brake mechanism EC very easily [when adsorption power decreases rapidly to zero only by stopping impression of an electrical potential difference], without giving deformation.

[0062] Furthermore, a location gap of the tape-like record medium 23 by attachment and detachment of the tape-like record medium 23 by the electrostatic brake mechanism EC is very small, and it becomes possible to make location management of the tape-like record medium 23 easily therefore.

[0063] Moreover, it is accomplished by static electricity, and since mechanical actuation is not required, it can operate promptly and attachment and detachment of the tape-like record medium 23 to the electrostatic brake mechanism EC can constitute lightweight.

[0064] The VTR equipment which reproduces the operation gestalt of the regenerative apparatus of the tape-like record medium concerning this invention next is explained to an example.

[0065] Drawing 5 is some block diagrams showing the system configuration of the VTR equipment which is 1 operation gestalt of the regenerative apparatus of the tape-like record medium concerning this invention, and shows the system configuration of servo system. Drawing 6 is the state transition diagram of this equipment. Moreover, drawing 7 is the Maine flow chart of the control program which shows actuation of this equipment. Furthermore, drawing 8 and drawing 9 are the flow charts of the servo processing in the Maine flow chart of drawing 7.

[0066] In drawing 5, a system control CPU 1 is a processing unit which controls this whole equipment. It connects with program memory 2 and a servo CPU 3 through a system bus, and a system control CPU 1 performs the control program of program memory 2 in response to the switch section and mode signal Md according to the actuation from remote control (neither is illustrated), and sends control lead to a servo CPU 3.

[0067] A servo CPU 3 performs a signal and data transfer through a system bus, and also is equipped with two or more input/output port. Hereafter, the function of the configuration section connected to each output port and input port is explained.

[0068] If S (supply) motor drive circuit (driver : it is the same as that of the following) 4 is connected to output port SD and a control signal is emitted from output port SD, based on this, S motor drive circuit 4 will carry out revolution actuation of the supply motor 5 at it. And from FG (frequency generator) prepared in the supply motor 5, FG signal generated with the revolution is inputted into input port SFG.

[0069] If C (capstan) motor drive circuit 6 is connected to output port CD and a control signal is emitted from output port CD, based on this, C motor drive circuit 6 will carry out revolution actuation of the capstan motor 7. And from FG prepared in the capstan motor 7, FG signal generated with the revolution is inputted into input port CFG.

[0070] D (drum) motor drive circuit 8 is connected to output port DD, and revolution actuation of the drum motor 9 is carried out at it. FG and PG (phase generator) are prepared in the drum motor 9, and FG signal according to rotational speed and PG signal which detects the location of a recording head and

the reproducing head in a list are inputted into it in input port DFG and input port DPG, respectively.

[0071] The drum motor 9 drives the drum device section (all over drawing, it is written as a drum) 10 linked directly. The time code head is prepared in the drum device section 10, and the time code signal in every frame recorded on the tape is reproduced, and it sends to PB amplifier circuit 11. PB amplifier circuit 11 amplifies and outputs the reproduced time code signal. TC (time code) reader circuit 12 evaluates the amplified time code signal, and inputs it into a system control CPU 1.

[0072] T (take up) motor drive circuit 13 is connected to output port TD, and revolution actuation of the take-up motor 14 is carried out at it. And FG signal generated with the revolution is inputted into input port TFG from FG prepared in the take-up motor 14.

[0073] The TPP (cassette / tension-arm / loading / pinch roller) drive circuit 15 is connected to output ports D1-D4, and a tape loading mechanism, the rise down device of a cassette, a tension arm, and a pinch roller style are driven to them.

[0074] The high voltage generating control circuit 16 is connected, an electrical potential difference is supplied to the high voltage generating circuit 17 which consists of a transformer etc., and output port HV is made to generate high tension. The generated high tension is supplied to an electrostatic braking object.

[0075] The sensor interface 18 is connected to input port V1-V3, and the detecting signal from a position sensor which detects the location of migration members, such as a tension sensor which detects the tension of a tape, a cassette sensor which detects the existence of a cassette, and a tension arm, is inputted into it.

[0076] If this equipment starts actuation, it will operate under either of each mode shown in drawing 6, and transition between the modes will be carried out. If an electric power switch is turned on, a system control CPU 1 will perform the Main flow shown in drawing 7. That is, after performing predetermined initialization processing (step S1), switch processing (step S2), mode setting processing (step S3), servo processing (step S4), video-signal processing (step S5), and other processings (step S6) are performed.

[0077] And it distinguishes whether the electric power switch became off (step S7), and in not being off, it shifts to step S2 and repeats each processing to step S6. In step S7, when an electric power switch is turned off, processing which stores in memory the mode set [which set up and power-source-off-processed] up is performed.

[0078] In the switch processing in step S2, actuation of the switch section or remote control is detected, and mode setting processing in step S3 is performed according to a detection result. In addition, in initialization processing of step S1, it is set as the stop mode in the state transition diagram of drawing 6 at first.

[0079] If a REC (record) switch is turned on in a stop mode by drawing 6, it will shift to REC mode, i.e., a recording mode, and in a recording mode, if a stop switch is turned on, it will return to a stop mode. In a stop mode, if PB (playback) switch is turned on, it will shift to the Normal playback mode, and in the Normal playback mode, if a stop switch is turned on, it will return to a stop mode.

[0080] In a stop mode, if FF (rapid traverse) switch or a REW (rewind) switch is turned on, it will shift to FF/REW mode. In FF / REW mode, if return and PB switch are turned on by the stop mode when a stop switch is turned on, it will shift to the Normal playback mode.

[0081] In the Normal playback mode, if FF switch or a REW switch is turned on, it will shift to JOG (jog) mode, and in JOG mode, if PB switch is turned on, it will return to the Normal playback mode.

[0082] In the Normal playback mode, if a STILL (still) switch is turned on, it will shift to still playback mode, and if PB switch is turned on in still

playback mode, it will return to the Normal playback mode.

[0083]A system control CPU 1 controls a servo CPU 3 through a system bus according to the set-up mode. That is, as shown in drawing 8, first, sensor processing (step S41) is performed and mode distinction processing (step S42) is performed.

[0084]In addition, in the sensor processing in step S41, in the input port V2 of the servo CPU 3 of drawing 5, when the sensor interface 18 detects not being equipped with the cassette yet, where a stop mode is maintained, wearing of a cassette is stood by. When equipped with a cassette, a tape is pulled out and loading control is performed. Since actuation of loading control is not directly related to this invention, it is omitted about the flow of servo processing of loading control.

[0085]That is, a loading signal is outputted from the output port (not shown) of a servo CPU 3, and the servo processing in the condition of having completed loading of a tape is explained.

[0086]In the loading completion condition of a tape, as shown in aforementioned drawing 2, the tape-like record medium 23 by which loading was carried out from the cassette 20 with which it was equipped is twisted around a rotating drum 24 through two or more guide pins 26 and revolution pins 29, and further, with a guide pin 26, a transit way, i.e., tape pass, is regulated and it results in a capstan 27 and a pinch roller 28. In addition, in an initial state, the transit way of the tape-like record medium 23 is located in the location distant from the electrostatic brake mechanism EC.

[0087]It is in the location which sandwiches the tape-like record medium 23, a pinch roller 28 is moved in the case of transit of a tape, and the capstan 27 and pinch roller 28 which were prepared during tape pass press the tape-like record medium 23 to a capstan 27, and they are constituted so that a tape may run certainly by the revolution of a capstan 27.

[0088]The revolution pin 29 attached in the tension regulation arm 34 here has given the fixed tension to the tape under transit.

[0089]Thus, where loading is made, when it distinguishes whether a mode change occurs in step S43 of drawing 8 and there is no mode change, this flow is ended and it returns to the Maine flow of drawing 7. When a mode change occurs, it distinguishes whether it is modification in still mode (step S44).

[0090]In being modification in still mode, the driving signal from output port CD of a servo CPU 3 is stopped, and off processing of the capstan motor 7 is carried out (step S45), and it stops the revolution of a capstan 27. Moreover, simultaneously, the driving signal from output port SD of a servo CPU 3 is stopped, off processing of the supply motor 5 is carried out (step S46), and a revolution of a supply reel is stopped.

[0091]Although the revolution of a capstan 27 stops in the meantime, a pinch roller 28 is still put on the location which presses a capstan 27. Consequently, the tape-like record medium 23 is being fixed between the capstan 27 and the pinch roller 28.

[0092]Next, the control signal which reduces a tape tension is outputted to the TTP drive circuit 15 from the output port D2 of a servo CPU 3 (step S47). With the control signal of tape tension reduction, the revolution pin 29 shown in drawing 1 moves to the still location X2, and the tension given to the tape-like record medium 23 is made to mitigate.

[0093]In step S48, it distinguishes whether the location of the revolution pin 29 moved to the still location X2. If the revolution pin 29 moves to the still location X2, the tape-like record medium 23 will move to the location which contacts the electrostatic brake mechanism EC.

[0094]Next, an ON control signal is outputted to the high voltage generating control circuit 16 from output port HV of a servo CPU 3, and ON processing (step S49) of the electrostatic brake mechanism EC is performed. Consequently, high tension is supplied to electrostatic electrode 31a of the electrostatic brake mechanism EC from the high voltage generating circuit 17, and the tape-like record medium 23 with which static electricity occurs and is in contact with

electrostatic electrode 31a is adsorbed.

[0095] After adsorption immobilization of the tape-like record medium 23 is carried out on the front face of the electrostatic brake mechanism EC, in step S50, a signal is outputted to the capstan motor drive circuit 6 from output port CD of a servo CPU 3, the capstan control unit 127 is driven, and the capstan motor 7 is reversed. That is, as shown in drawing 1, a capstan 27 is rotated in the direction of an arrow head, and only the specified quantity returns the tape-like record medium 23 to the reverse sense with the direction V of an arrow head W, i.e., the transit direction at the time of playback.

[0096] Consequently, the tape-like record medium 23 in contact with the perimeter of a rotating drum 24 moves to the location of 23C which deserted the rotating drum 24 still more nearly thoroughly from the location of 23A in the location of 23B which deserted the rotating drum 24 selectively. A tape tension becomes 0g in the location of about 7g and 23B in the location of 23A in the location of about 0.5g and 23C. In the location of 23C, the air space (air film) 35 which continued between the peripheral face of a rotating drum 24 and the tape-like record medium 23 is formed. In this case, recording head 25a prepared in the rotating drum 24, reproducing-head 25b, and erase-head 25c do not contact the tape-like record medium 23.

[0097] Since it is fixed by two points of the electrostatic brake mechanism EC and a capstan 27, the tape-like record medium 23 with which the tension furthermore fell to 0g in this case does not slip down downward.

[0098] Moreover, the tape-like record medium 23 fixed by the two above-mentioned points is not involved in by revolution of a rotating drum 24.

[0099] In order to perform control which moves the tape-like record medium 23 to the location of 23C, it is necessary to control the amount of return of the tape-like record medium 23. For this reason, FG signal which is proportional to the rotation of the capstan motor 7 which carries out revolution actuation of the capstan 27 in input port CFG at a servo CPU 3 detects the rotation of a capstan 27. That is, in step S51, it distinguishes whether the predetermined revolution of a capstan 27 was completed.

[0100] When the predetermined revolution of a capstan 27 is not completed, inversion processing of the capstan motor 7 in step S50 is continued. Since the air space 35 of predetermined spacing is formed between a rotating drum 24 and the tape-like record medium 23 when the predetermined revolution of a capstan 27 is completed, this flow is ended and it returns to the Main flow of drawing 7.

[0101] On the other hand, in step S44, when a mode change is not modification in still playback mode, it distinguishes whether it is modification to the Normal playback mode (step S52). In being modification to the Normal playback mode, it distinguishes whether the current mode is still playback mode and it is during still playback (step S53).

[0102] In being during still playback, it performs off processing (step S54) of the electrostatic braking object 31 by turning OFF the signal from output port HV of a servo CPU 3 to the high voltage generating control circuit 16, and suspending supply of the high tension from the high voltage generating circuit 17 to the electrostatic braking object 31.

[0103] Next, the signal from the output port D2 of a servo CPU 3 to the TTP drive circuit 15 is controlled, and increment processing in a tape tension is performed (step S55). And it distinguishes whether the revolution pin 29 in drawing 1 moved to the playback transit location X1 (step S56). When not moving to the playback transit location X1, processing of step S55 is continued until it moves to the playback transit location X1.

[0104] In this case, since residual static electricity decreases quickly when supply of high tension is not made by the electrostatic braking object 31, only by moving the revolution pin 29 to the playback transit location X1, the tape-like record medium 23 separates from the electrostatic braking object 31 you to be Sumiya, and can shift to the preparatory state of the Normal playback

promptly. It is made smoothly, without furthermore a truck gap arising [the shift to the Normal playback] in this case.

[0105] If the revolution pin 29 moves to the playback transit location X1, a signal will be outputted from output port CD and output port SD of a servo CPU 3, ON processing of the capstan motor 7 will be performed (step S57), and ON processing of the supply motor 5 will be performed (step S58). Thereby, the Normal playback begins. If the Normal playback begins, this flow will be ended and it will return to the Maine flow chart of drawing 7.

[0106] Moreover, in step S52, when a mode change is not the Normal playback mode, it moves to the entry number 1 of the flow of drawing 9. In step S71 of drawing 9, it distinguishes whether it is modification to a stop mode. In being modification to a stop mode, the output port D4 of a servo CPU 3, output port CD, output port SD, and output port DD are turned OFF, respectively, and it performs off processing (step S75) of off processing (step S74) of off processing (step S73) of off processing (step S72) of a pinch roller 28 and the capstan motor 7 and the supply motor 5 and the drum motor 9.

[0107] Next, the signal from the output port D2 of a servo CPU 3 to the TTP drive circuit 15 is controlled, and processing which reduces a tape tension is performed (step S76). And the tension regulation arm 34 distinguishes whether it moved to the halt location in a stop mode (step S77).

[0108] When the tension regulation arm 34 is not moving to a halt location, processing of step S76 is continued until it moves to a halt location. When the tension regulation arm 34 moves to a halt location, this flow is ended and it returns to the Maine flow of drawing 7.

[0109] In step S71, although it is modification to JOG mode, FF/REW mode, or a recording mode when a mode change is not modification to a stop mode, explanation is omitted.

[0110] Moreover, in step S52 of drawing 8, a mode change is carried out to the Normal playback mode, when [moreover in step S53, the present mode is not during still playback (i.e., a case)] it is under stop, in drawing 9, the signal from the output port D2 of a servo CPU 3 to the TTP drive circuit 15 is controlled, and increment processing in a tape tension is performed (step S78).

[0111] And it distinguishes whether the revolution pin 29 in drawing 1 moved to the tape transit location X1 (step S79). When the revolution pin 29 is not moving to a playback transit location, processing of step S78 is continued until it moves to a playback transit location.

[0112] When the revolution pin 29 moves to a playback transit location, a signal is outputted from output port CD of a servo CPU 3, output port SD, and output port DD, ON processing of the capstan motor 7 is performed (step S80), ON processing of the supply motor 5 is performed (step S81), and ON processing of the drum motor 9 is performed (step S82). And this flow is ended and it returns to the Maine flow of drawing 7.

[0113] As mentioned above, according to this operation gestalt, depend an electrostatic brake mechanism on having considered as the configuration operated effectively. Breakage prevention of the tape under still playback mode, contamination prevention of a tape, and omission prevention of a tape are not only realized, but it was shown clearly that transition and shift were attained very smoothly without [without the shift to other modes / mode / still playback / or the shift to still playback mode from other modes spoils the function of an electrostatic brake mechanism, and] an electrostatic brake mechanism checking actuation in other modes.

[0114] In addition, in the above-mentioned operation gestalt, although the tape on which the video signal was magnetically recorded as a tape-like record medium was explained, also in the case of the tape which recorded the information signal optically, this invention can be applied, without being limited to this.

[0115] Moreover, in the above-mentioned operation gestalt, although VTR equipment equipped with the rotary head was taken for the example and this invention was explained, the field which can apply this invention is not limited to VTR

equipment. For example, digital data other than a video signal are applicable also to the equipment recorded and reproduced and its control approach like the magnetic tape recorder equipped with the rotary head.

[0116]Also in equipments, such as a magnetic tape recorder, since some parts of a tape are repeated and it reproduces in case the data currently recorded are edited, a tape may be damaged. Therefore, by attaching the electrostatic brake mechanism in this invention in equipments, such as such a magnetic tape recorder, by applying the playback approach in this invention again, breakage can be done to a record-medium tape, or a tape can prevent being involved in a revolution member etc.

[0117]Moreover, as an information signal to reproduce; you may be the digitized voice signal recorded on the tape. For example, also in DAT, since some parts of a tape are repeated and it reproduces in editing the recorded sound signal, a tape may be damaged. Therefore, by attaching the electrostatic brake components in this invention in such DAT equipment, breakage can be done to a tape or a tape can prevent being involved in a revolution member etc.

[0118]

[Effect of the Invention]As mentioned above, although the tension which is made to suspend transit of a tape-like record medium and is further given to a tape-like record medium is made to ease, rotating a rotating drum in case special playback of still playback etc. is performed, for exampleBy according to this invention, the electrostatic braking object of an electrostatic brake mechanism making the tape-like record medium with which it stopped and the tension was eased adsorb with static electricity, and carrying out fixed maintenance, and carrying out fixed maintenance of the tape-like record medium in a capstanIt considers as the configuration which reduces further the tension given to a tape-like record medium.

[0119]Moreover, the tape of the specified quantity is sent into a rotating-drum side by the counterrotation of the capstan of a down-stream location from a rotating drum, after increasing a tape, a tape-like record medium carries out fixed maintenance by the capstan, the air space which given thickness therefore followed is made to form in a rotating-drum periphery, and a tape-like record medium is made to desert a rotating-drum periphery thoroughly by this continuous air space by some allowances after fixed maintenance of the tape-like record medium by the electrostatic brake mechanism.

[0120]Thereby, the tape-like record medium used as a low tension becomes easy to ride on the air space formed in a rotating-drum periphery, and can make a tape-like record medium desert a rotating-drum periphery thoroughly by this air space. Consequently, even if it is lost during still playback that a tape-like record medium contacts a rotating drum and prolonged still playback is made, breakage on the tape-like record medium by the collision with a rotating-drum side face or a head can be prevented, and wear of a head can be prevented simultaneously.

[0121]Moreover, by making an electrostatic brake mechanism carry out electrostatic adsorption, fixing a tape-like record medium to it, carrying out fixed maintenance and holding two tape-like record media in a capstan, further, even if a tension falls, a tape-like record medium is not omitted.

[0122]Since it is not generated by the amount of [beyond this] play in the amount of tapes by making an electrostatic brake mechanism carry out electrostatic adsorption, fixing a tape-like record medium to it, carrying out fixed maintenance and moreover holding two tape-like record media in a capstan further, it can prevent that a tape-like record medium is involved in the drum under revolution.

[0123]And since it holds to an electrostatic brake mechanism, without applying mechanical press to a tape-like record medium, breakage on deformation etc. is not done to a tape-like record medium during maintenance.

[0124]Furthermore, an electrostatic brake mechanism can make a tape-like record medium secede from an electrostatic brake mechanism very easily [when adsorption

power decreases rapidly to zero only by stopping impression of an electrical potential difference], without giving deformation.

[0125] Furthermore, a location gap of the tape-like record medium at the time of the attachment and detachment to the electrostatic brake mechanism of a tape-like record medium is small, and it becomes possible to make location management of a tape-like record medium easily therefore.

[0126] Moreover, it succeeds in attachment and detachment of the tape-like record medium to an electrostatic brake mechanism with static electricity, and since mechanical actuation is not required, it can operate promptly and there is remarkable effectiveness that it can constitute lightweight.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the explanatory view of the configuration of 1 operation gestalt of the electrostatic brake mechanism concerning this invention.

[Drawing 2] It is the ** type perspective view of the important section of the VTR equipment with which the electrostatic brake mechanism shown in drawing 1 was incorporated.

[Drawing 3] It is the perspective view of the example of a configuration of the electrostatic braking object of the electrostatic brake mechanism shown in drawing 1.

[Drawing 4] It is the explanatory view of the inclusion condition of the electrostatic brake mechanism shown in drawing 1.

[Drawing 5] It is the block diagram of the system in 1 operation gestalt of the regenerative apparatus of the tape-like record medium of this invention.

[Drawing 6] It is the state transition diagram of the regenerative apparatus of the tape-like record medium shown in drawing 5.

[Drawing 7] It is the Maine flow chart of the control program of the regenerative apparatus of the tape-like record medium shown in drawing 5.

[Drawing 8] It is the flow chart of the servo processing in the flow chart of drawing 7.

[Drawing 9] It is the flow chart of the servo processing following drawing 9.

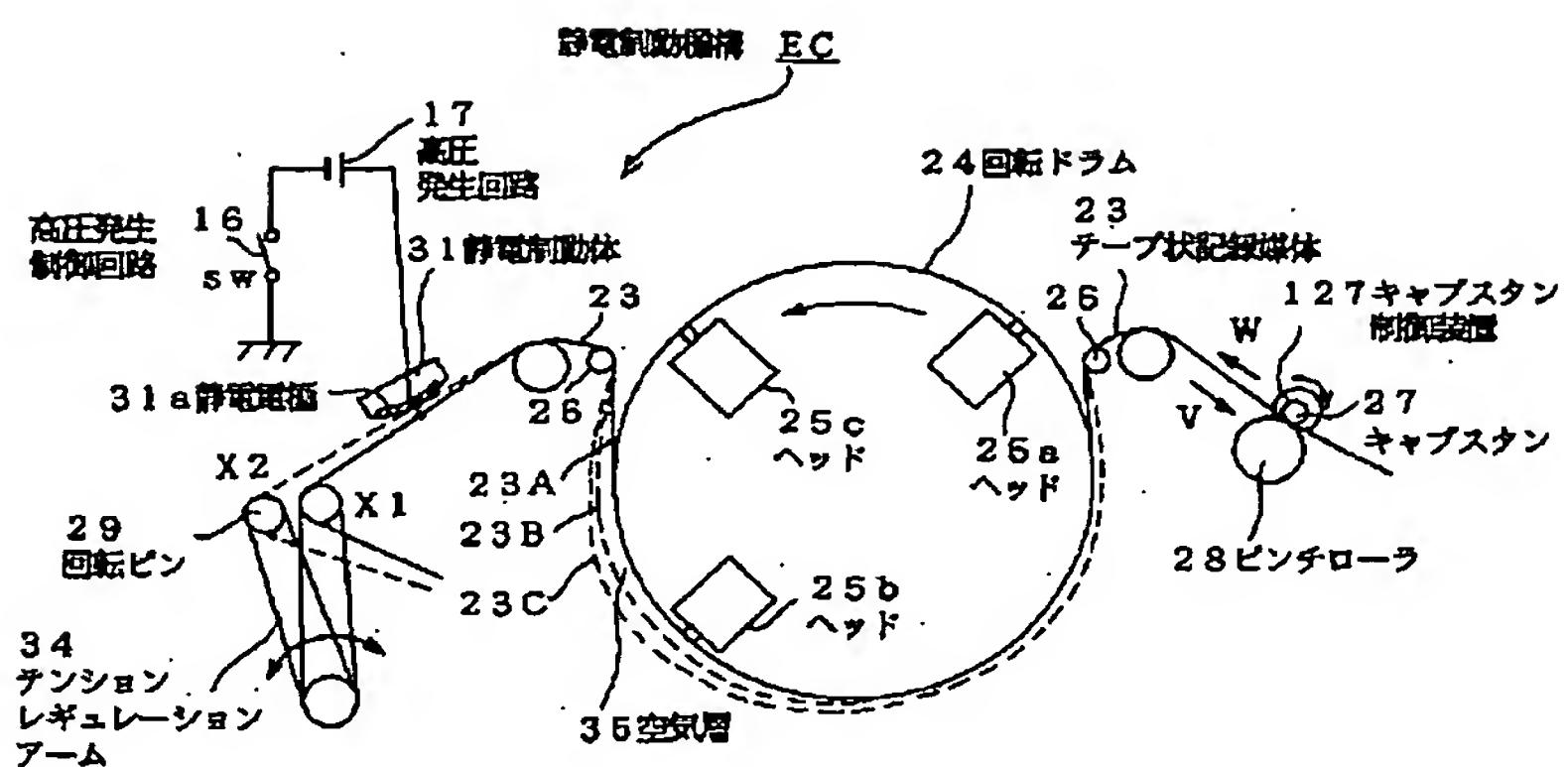
[Drawing 10] It is the ** type perspective view of the important section of the conventional VTR equipment with which it was equipped with the tape.

[Description of Notations]

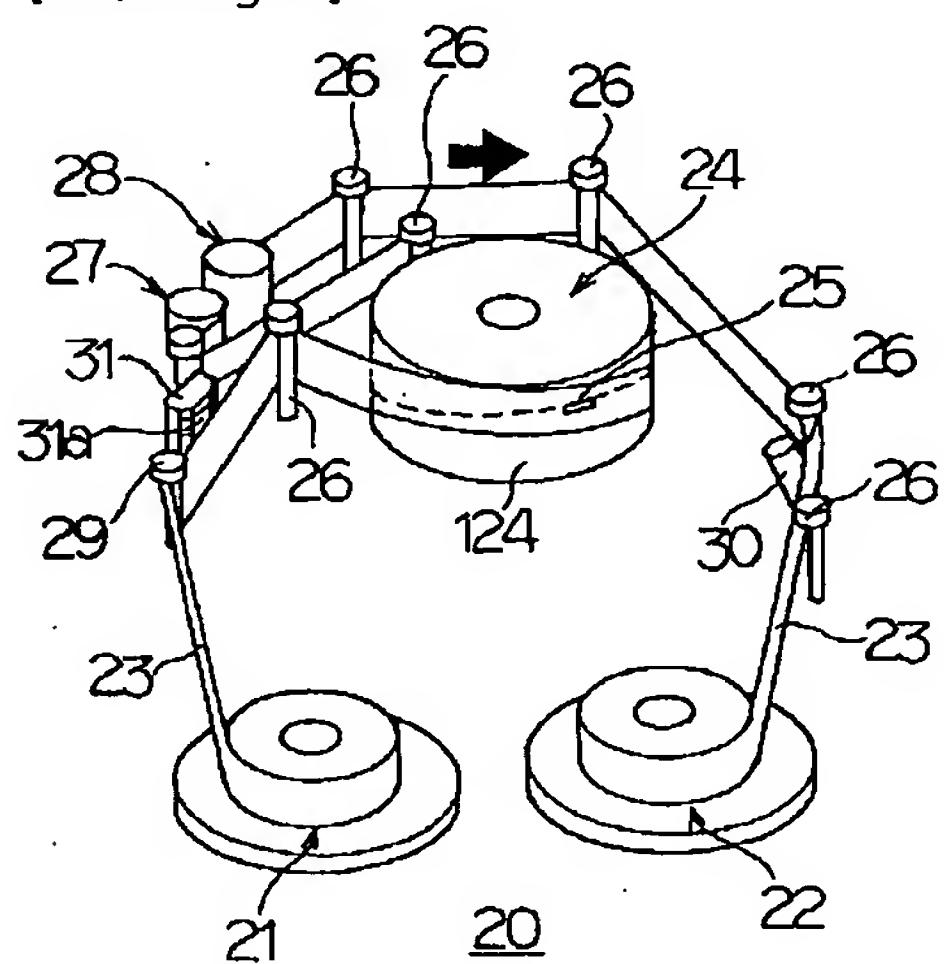
EC The electrostatic brake mechanism, 16 concerning this invention .. A high voltage generating control circuit, 17 .. High voltage generating circuit, 23 A tape-like record medium (tape), 24 .. A rotating drum, 25a-25c .. Head, 26 A guide pin, 27 .. A capstan, 28 .. Pinch roller; 29 [.. A tension regulation arm, 35 / .. An air space, 127 / .. A capstan control unit, V / .. The transit direction of the tape-like record medium at the time of playback W / .. The reverse transit direction of a tape-like record medium] A revolution pin, 31 .. An electrostatic braking object, 31a .. An electrostatic electrode, 34

DRAWINGS

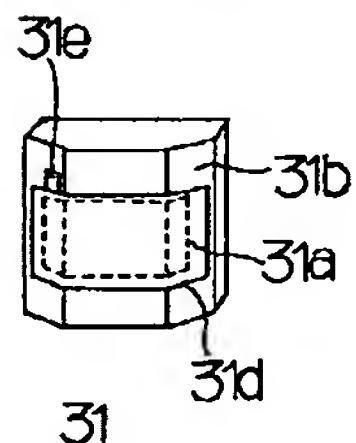
[Drawing 1]



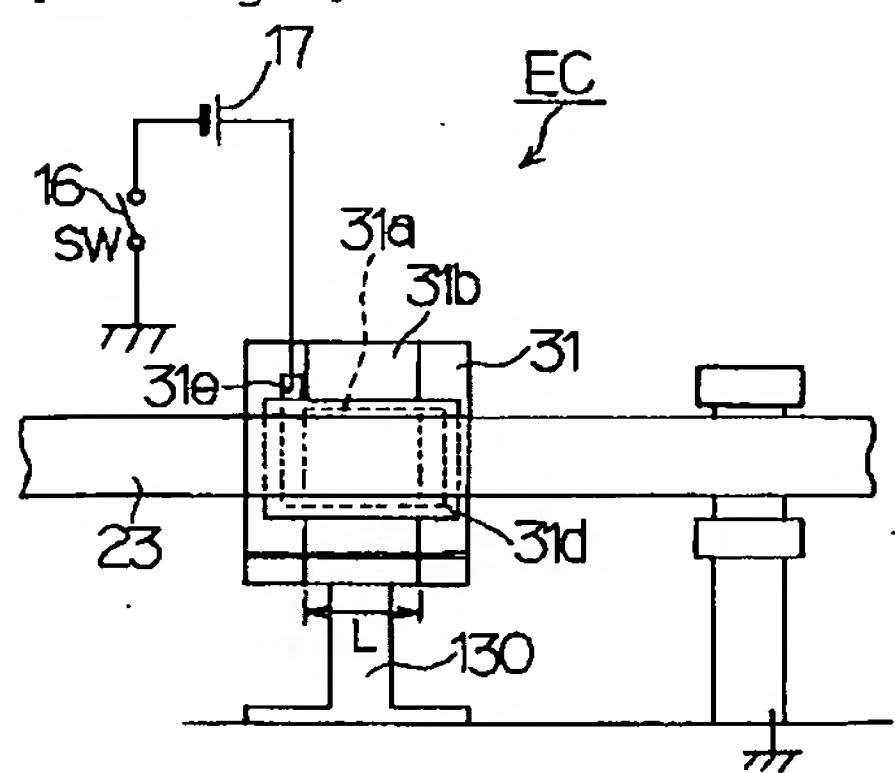
[Drawing 2]



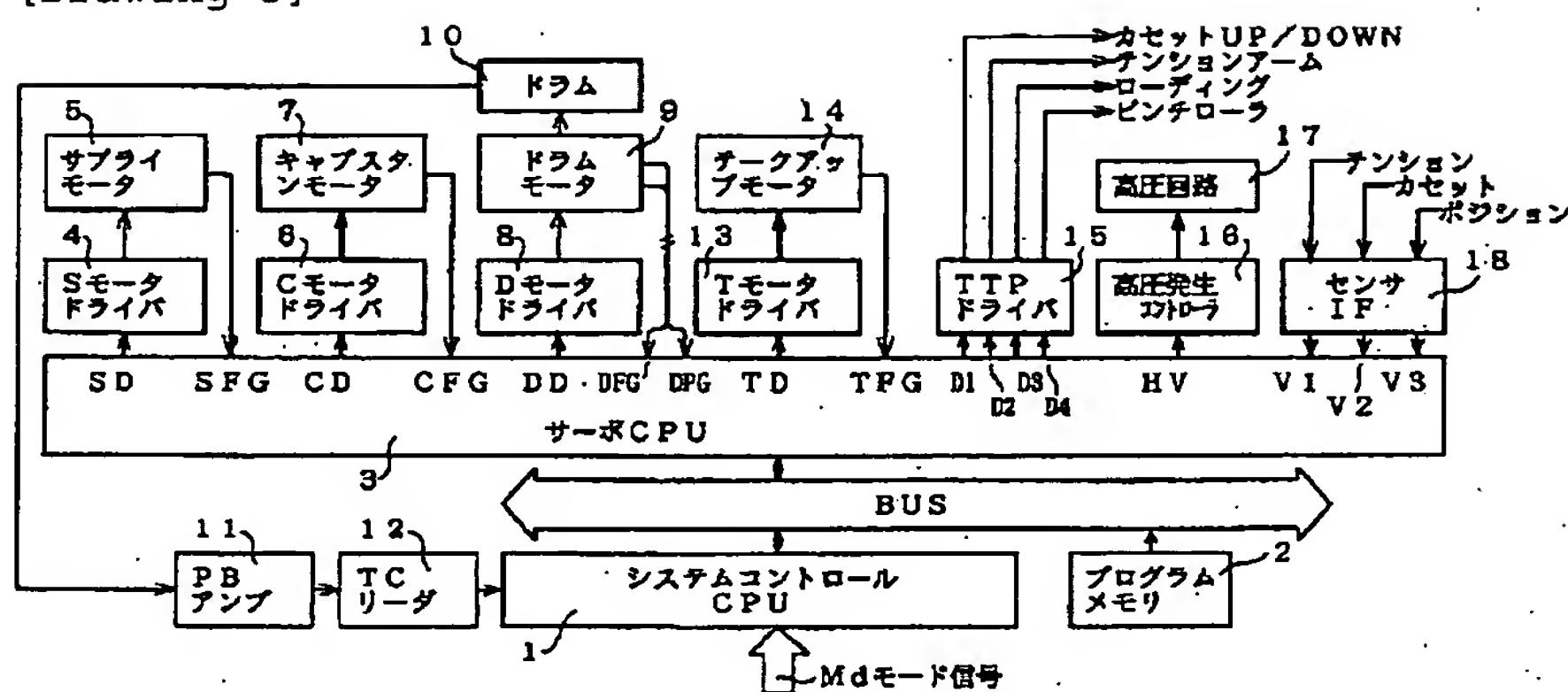
[Drawing 3]



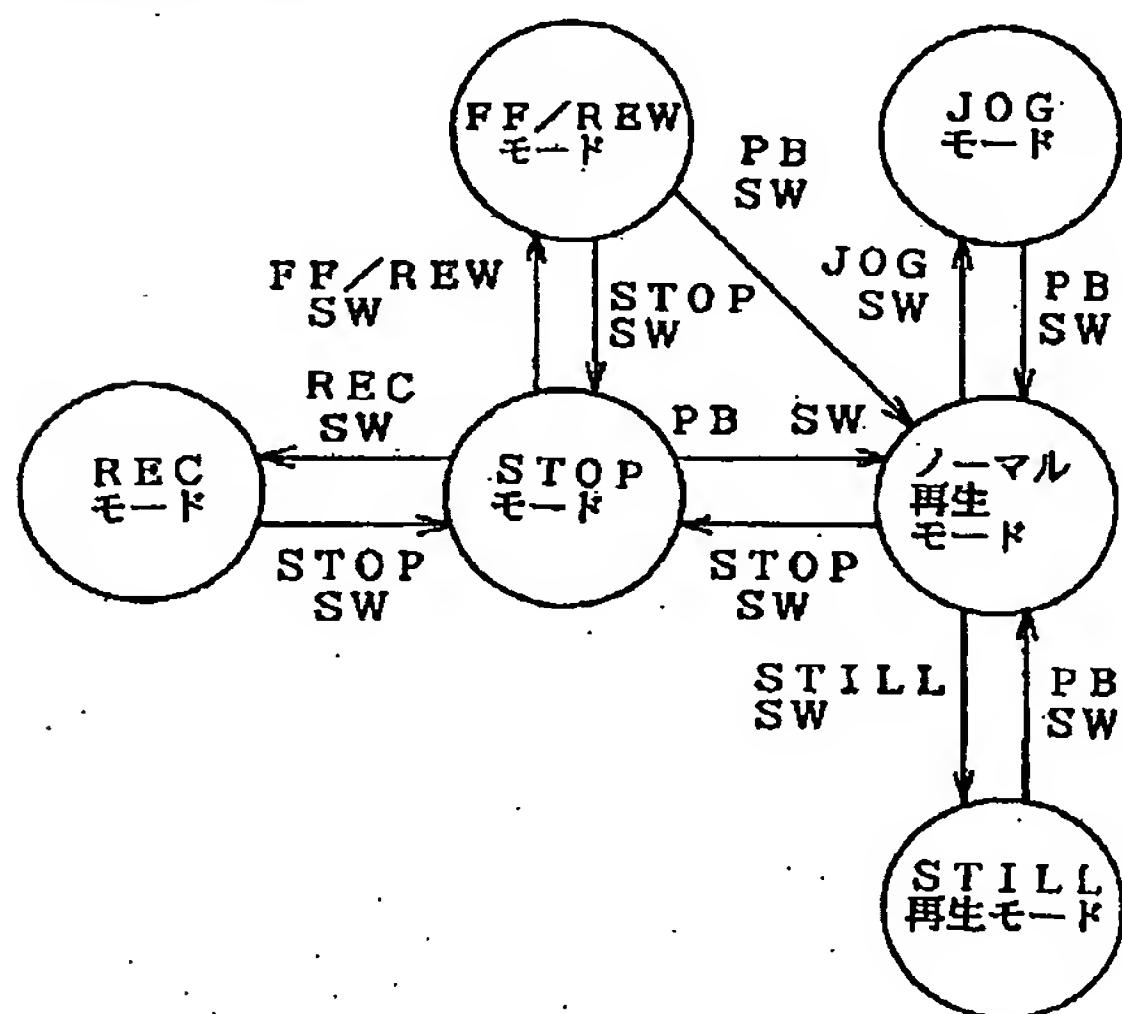
[Drawing 4]



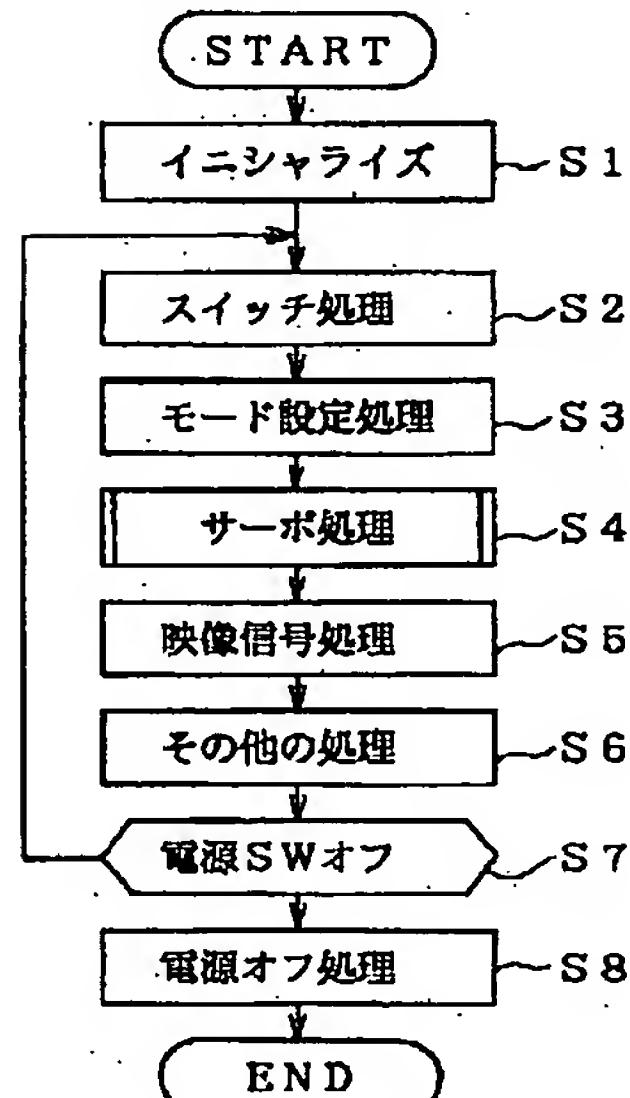
[Drawing 5]



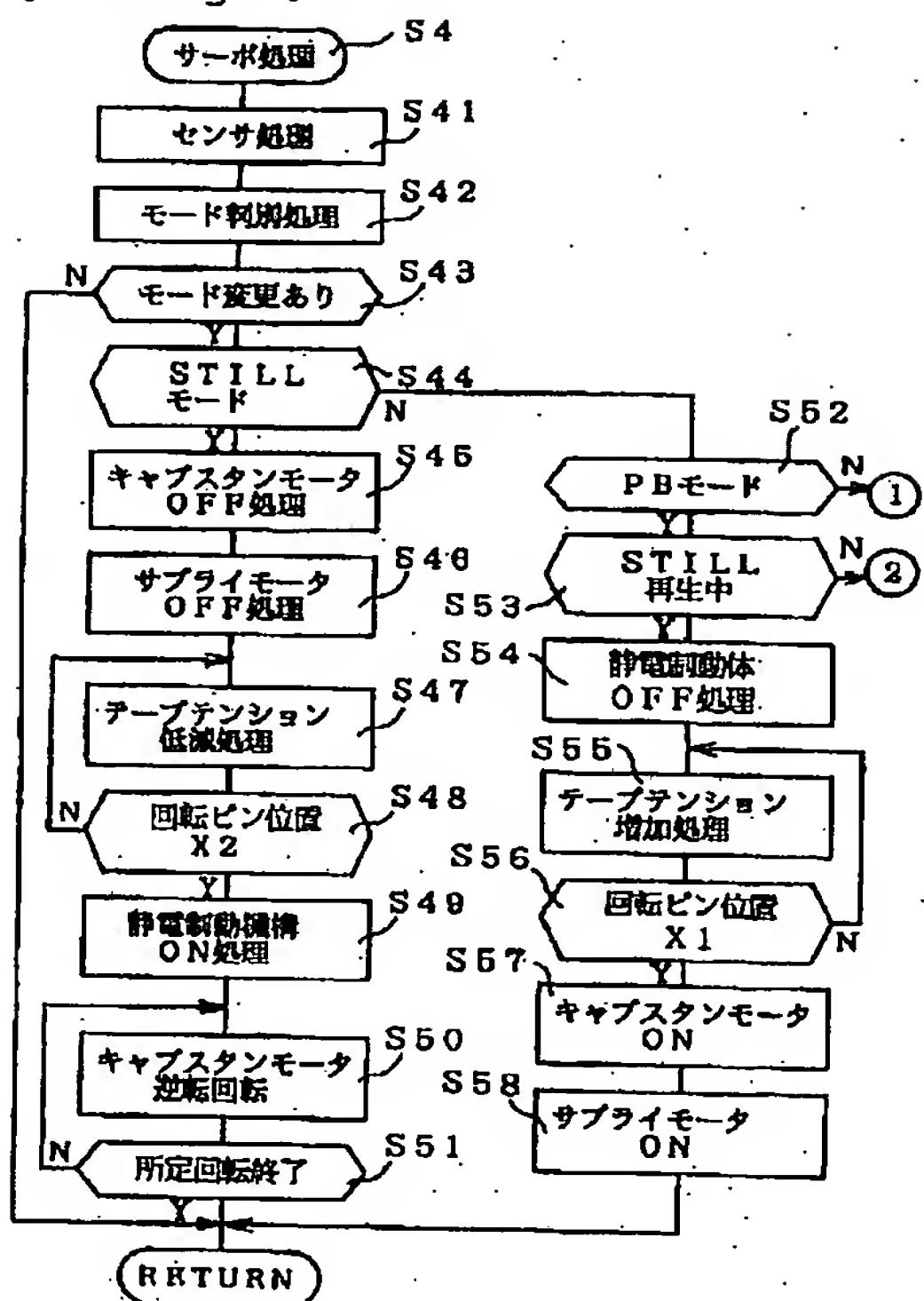
[Drawing 6]



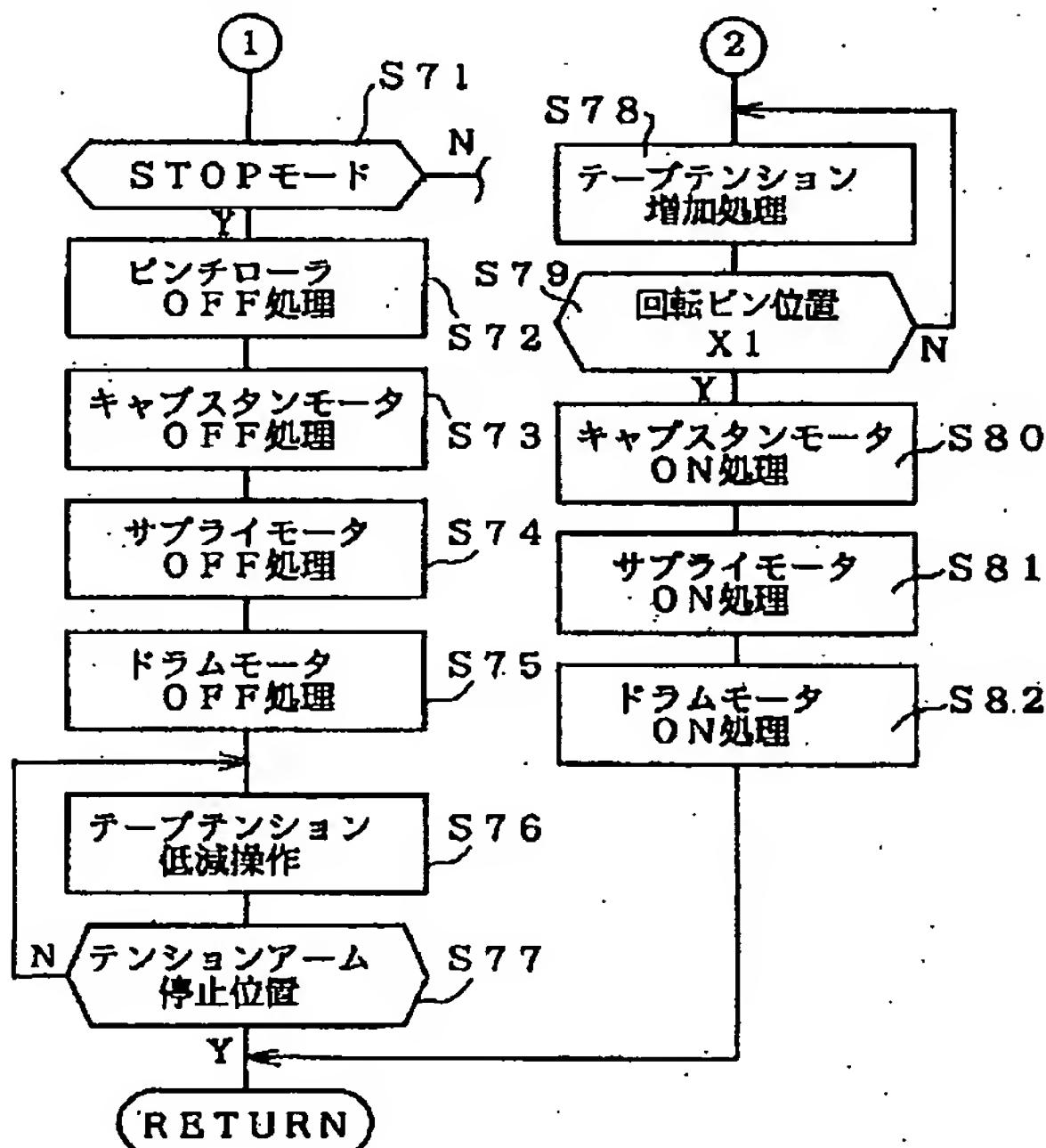
[Drawing 7]



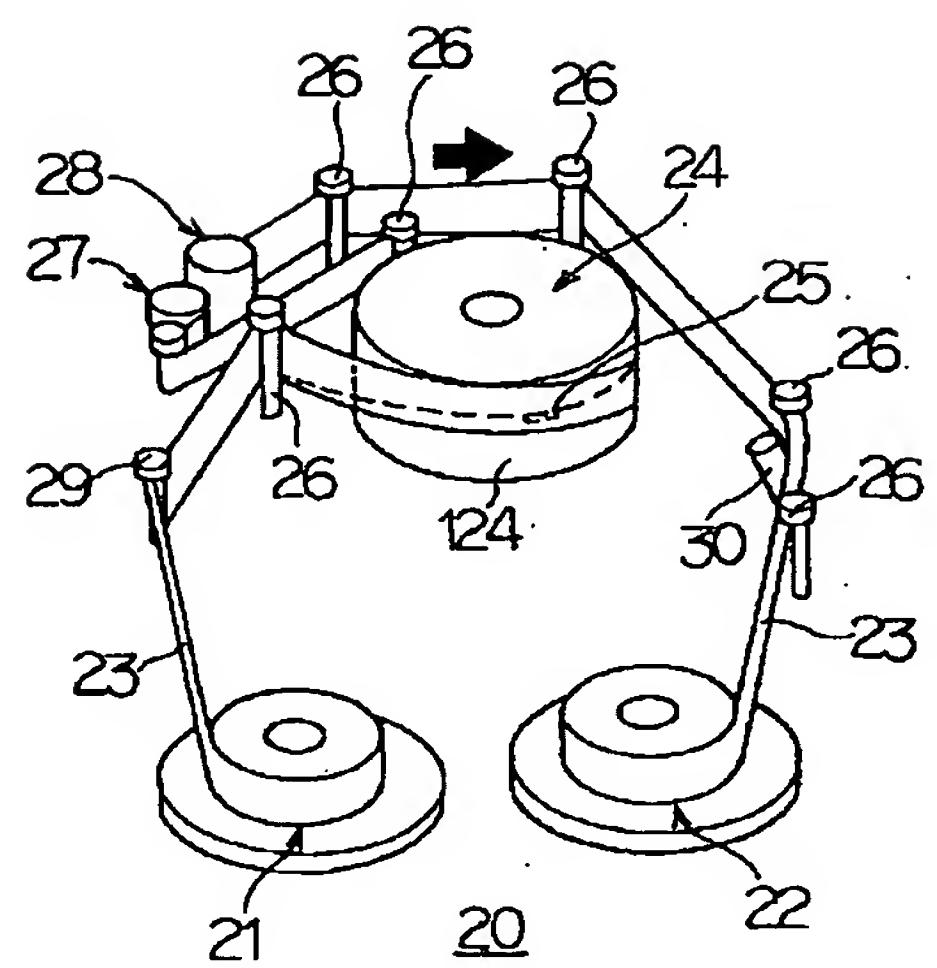
[Drawing 8]

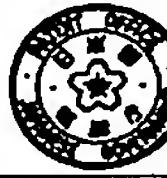


[Drawing 9]



[Drawing 10]





PATENT ABSTRACTS OF JAPAN

(11) Publication number: **2000251349 A**

(43) Date of publication of application: 14.09.00

(51) Int. Cl.

G11B 15/40

G11B 15/43

(21) Application number: 11050225

(71) Applicant: **SONY CORP**

(22) Date of filing: 26.02.99

(72) Inventor: KANEKO SHINJI
SAWAI ATSUSHI

(54) ELECTROSTATIC BRAKING MECHANISM,
ELECTROSTATIC ELECTRODE FOR TAPE-LIKE
RECORDING MEDIUM, AND REPRODUCING
DEVICE AND REPRODUCING METHOD OF
TAPE-LIKE RECORDING MEDIUM

rotation of a capstan 27 positioned at the downstream side from the rotary drum 24, the tape-like recording medium 23 is fixed and held at the position of the capstan 27.

(57) Abstract:

PROBLEM TO BE SOLVED: To obtain stable and highly reliable electrostatic braking mechanism and electrostatic electrode for a tape-like recording medium, a reproducing device of the tape-like recording medium and the reproducing method, by preventing the tape-like recording medium from damaging, rolling in a rotary member, etc., and further falling off, in the still reproduction.

SOLUTION: The running state of the running tape-like recording medium 23 which is wound on a rotary drum 24 having heads 25 while the tension is added, is stopped and the tape-like recording medium 23 is electrostatically attracted and fixed by the electrostatic braking mechanism EC arranged at the upstream side from the rotary drum 24, and after the tape-like recording medium 23 is inversely fed to the direction W in some amount by the reverse

COPYRIGHT: (C)2000,JPO

